

DOE PLAN TO EVALUATE BECHTEL NATIONAL INC., CAPABILITY TO CHANGE THE RPP-WTP AUTHORIZATION BASIS



January 26, 2001

Office of Safety Regulation of the RPP-WTP Contractor

U.S. Department of Energy
Office of River Protection
P.O. Box 450, H6-60
Richland, Washington 99352

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Approved by: _____
Safety Regulation Official

Date: _____

Preface

As directed by Congress in Section 3139 of the *Strom Thurmond National Defense Authorization Act for Fiscal Year 1999*, The U.S. Department of Energy (DOE) established the Office of River Protection (ORP) at the Hanford Site to manage the River Protection Project (RPP), formerly known as the Tank Waste Remediation System. ORP is responsible for the safe storage, retrieval, treatment, and disposal of the high level nuclear waste stored in the 177 underground tanks at Hanford.

The initial concept for treatment and disposal of the high level wastes at Hanford was to use private industry to design, construct, and operate a Waste Treatment Plant (WTP) to process the waste. The concept was for DOE to enter into a fixed-price contract for the contractor to build and operate a facility to treat the waste according to DOE specifications. In 1996, DOE selected two contractors to begin design of a WTP to accomplish this mission. In 1998, one of the contractors was eliminated, and design of the WTP was continued. However, in May 2000, DOE chose to terminate the privatization contract and seek new bidders under a different contract strategy. In December 2000, a team led by Bechtel National, Inc. was selected to continue design of the WTP and to subsequently build and commission the WTP.

A key element of the River Protection Project Waste Treatment Plant (RPP-WTP) is DOE regulation of safety through a specifically chartered, dedicated Office of Safety Regulation (OSR). The OSR reports directly to the ORP Manager. The regulation by the OSR is authorized by the document entitled *Policy for Radiological, Nuclear, and Process Safety Regulation of the River Protection Project Waste Treatment Plant Contractor* (DOE/RL-96-25) (Policy) and implemented through the document entitled *Memorandum of Agreement for the Execution of Radiological, Nuclear, Process Safety Regulation of the RPP-WTP Contractor* (DOE/RL-96-26) (referred to as the MOA). These two documents provide the basis for the safety regulation of the RPP-WTP Project at Hanford.

The foundation of both the Policy and the MOA is that the mission of removal and immobilization of the existing large quantities of tank waste by the RPP-WTP Contractor must be accomplished safely, effectively, and efficiently.

The Policy maintains the essential elements of the regulatory program established by DOE in 1996 for the privatization contracts. The MOA clarifies the DOE organizational relationships and responsibilities for safety regulation of the RPP-WTP project. The MOA provides a basis for key DOE officials to commit to teamwork in implementing the policy and achieve adequate safety of RPP-WTP activities.

The Policy, the MOA, the RPP-WTP Contract and the four documents incorporated in the Contract define the essential elements of the regulatory program being executed by the OSR. The four documents incorporated into the Contract (and also in the MOA) are:

Concept of the DOE Process for Radiological, Nuclear, and Process Safety of the RPP Waste Treatment Plant Contractor, DOE-96-0005,

DOE Process for Radiological, Nuclear, and Process Safety Regulation of the RPP Waste Treatment Plant Contractor, DOE/RL-96-0003,

Top-Level Radiological, Nuclear, and Process Safety Standards and Principles for the RPP Waste Treatment Plant Contractor, DOE/RL-96-0006, and

Process for Establishing a Set of Radiological, Nuclear, and Process Safety Standards and Requirements for the RPP Waste Treatment Plant Contractor, DOE/RL-96-0004.

DOE patterned its safety regulation of the RPP-WTP contractor to be consistent with the concepts and principles of good regulation (stability, clarity, openness, efficiency, and independence) used by the Nuclear Regulatory Commission (NRC). In addition, the DOE principles of integrated safety management were built into the regulatory program for design, construction, operation, and deactivation of the facility. The regulatory program for nuclear safety permits waste treatment services to occur on a timely, predictable and stable basis, with attention to safety consistent with that which would occur from safety regulation by an external agency. DOE established OSR as a dedicated regulatory organization to be a single point of DOE contact for nuclear safety oversight and approvals for the WTP Contractor. The OSR performs nuclear safety review, approval, inspection, and verification activities for ORP using the NRC principles of good regulation while defining how the contractor shall implement the principles of standards-based integrated safety management.

A key feature of this regulatory process is its definition of how the standards-based integrated safety management principles are implemented to develop a necessary and sufficient set of standards and requirements for the design, construction, operation, and deactivation of the RPP-WTP facility. This process closely parallels the DOE necessary and sufficient closure process (subsequently renamed Work Smart Standards process) in DOE Policy 450.3, *Authority for the Use of the Necessary and Sufficient Process for Standards-based Environment, Safety and Health Management*, I-25-96, and is intended to be a DOE approved process under DOE Acquisition Regulations, DEAR 970.5204-78, *Laws, Regulations and DOE Orders*, section (c). DOE approval of the contractor-derived standards is assigned to the OSR.

The RPP-WTP Contractor has direct responsibility for WTP safety. DOE requires the Contractor to integrate safety into work planning and execution. This Integrated Safety Management (ISM) process emphasizes that the Contractor's direct responsibility for ensuring safety is an integral part of mission accomplishment. DOE, through its safety regulation and management program, verifies that the Contractor achieves adequate safety by complying with approved safety requirements.

All documents issued by the Office of Safety Regulation are available to the public through the DOE Public Reading Room at the Consolidated Information Center, Washington State University, Room 101L, Richland, Washington. Copies may be purchased for a duplication fee.

RECORD OF REVISION

Document Title: DOE Plan to Evaluate Bechtel National Inc., Capability to Change the RPP-WTP Authorization Basis

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DOE PLAN TO EVALUATE BECHTEL NATIONAL, INC. CAPABILITY TO CHANGE THE RPP-WTP AUTHORIZATION BASIS

1.0 BACKGROUND

On December 11, 2000, the U.S. Department of Energy (DOE), Office of River Protection (ORP), announced that it had selected Bechtel National, Inc. (BNI) to design, construct, and commission the River Protection Program Waste Treatment Plant (RPP-WTP). BNI will take over responsibilities that had been assigned on an interim basis to CH2M Hill Hanford Group, Inc. (CHG). BNI began a transition from CHG on January 15, 2001.

As interim design manager, CHG had adapted the programs, processes, and procedures that BNFL Inc. (BNFL) had developed and implemented for any work it performed that affected the authorization basis (AB). The AB for the RPP-WTP is the composite of information provided by the Contractor in response to radiological, nuclear, and process safety requirements and that is the basis on which DOE grants permission to perform regulated activities. To authorize CHG to make changes to the AB, the Office of Safety Regulation (OSR) (formerly called the Regulatory Unit) evaluated CHG's capability to make changes to the AB. After completing identified corrective actions (see Appendix A for listing), the OSR approved CHG on November 15, 2000, to make changes to the AB.

Similarly, before BNI is authorized to change the AB of the WTP, the OSR will evaluate its capability to do so. This OSR evaluation will consider the proposed BNI programs, processes, and procedures for performing work that impacts the AB to ensure that they are acceptable before BNI can make any changes to the AB.

Since BNI does not expect to substantially staff its organization (beyond key managers and a few engineers who will perform important to safety work), this evaluation will emphasize the assessment of the transfer of documentation, and the adequacy of the staffing plan and training programs. A follow-up inspection will be conducted after BNI has completed significant staffing, to verify the staffing and training plans were adequately executed.

2.0 PURPOSE

This review evaluates BNI's capability to make changes to the RPP-WTP AB, consistent with the RPP-WTP AB requirements, and provides the results of the evaluation to the Manager, ORP. This evaluation will verify the safety equivalency of the proposed BNI AB documents, programs, procedures, and processes to the approved CHG AB documents.

3.0 SCOPE

The evaluation will consist of an in-office review of BNI AB documents and a field review of BNI programs, processes, and procedures. Where appropriate, the evaluation plan will be derived from selected elements of OSR inspection procedures.

The in-office review will evaluate the safety equivalency of the proposed BNI AB documents to the DOE-approved CHG AB documents. This part of the evaluation will examine the redline/strikeout versions of the AB documents listed below to confirm the appropriateness of the changes made as a result of the organizational change to BNI from CHG:

- Integrated Safety Management Plan (ISMP) – Lead Evaluator: Ninu Kaushal
- Safety Requirements Document (SRD) – Lead Evaluator: Bob Griffith
- Radiation Protection Program (RPP) – Lead Evaluator: Jeanie Polehn
- Quality Assurance Program (QAP) – Lead Evaluator: Pat Carier
- Hazard Analysis Report (significant and bounding hazards as described) – Lead Evaluator: Bob Griffith
- Employee Concerns Program – Lead Evaluator: Neal Hunemuller
- Initial Safety Analysis (fundamental aspects of design as described) – Lead Evaluator: Bob Griffith.

To ensure safety equivalency, the field review will evaluate changes to programs, processes, and procedures and will evaluate the adequacy of BNI staff training and qualifications. Specifically, the field review will verify the following:

- BNI has trained its staff on the BNI AB documents, programs, processes, and procedures to the extent required to adequately perform design activities. Emphasis will be placed on evaluating the training and training plans for new BNI employees, and concerning the proposed transition of the existing CHG employees to BNI. Of particular interest will be the staff transition plans, including the timing for the proposed transfer of staff between CHG and BNI, the training required to accomplish the transition, and the schedule for completing training of new employees. (Evaluator: Neal Hunemuller)
- BNI has implemented the key elements of an organization equivalent to that defined in the BNI Integrated Safety Management Plan (ISMP) and Quality Assurance Plan (QAP), and has a clear and comprehensive staffing plan to complete this organization. The personnel clearly understand their roles and responsibilities within the new organization, and measures to ensure that new personnel have this understanding before beginning work are established. (Evaluator: Ron Lerch)

- BNI has assigned qualified personnel to implement its Employee Concerns Program. (Evaluator: Neal Hunemuller)
- BNI is tracking open OSR inspection items and previous project commitments associated with these inspection items. This part of the evaluation is intended not to close the items, but to verify tracking to closure. The evaluation will determine BNI's understanding of the status of commitments and open inspection items. (See Appendix B for a listing of these items, and Appendixes C and D for the corresponding Commitment Management System [CMS] Reports.) (Evaluator: Jim McCormick-Barger)
- BNI is tracking open issues from the Initial Safety Assessment (ISA)¹ and topical meetings and has plans to address these issues. The evaluation does not intend to close these issues during the evaluation. (See Appendix E for a list of these items.) (Evaluator: George Kalman)
- BNI has implemented the approved QAP. (Evaluator: Pat Carier)
- BNI has implemented an effective configuration management program to maintain administrative and technical programs. (Evaluator: Jim Adams)
- BNI has implemented an effective design process consistent with the AB requirements. (Evaluator: Rob Gilbert)
- BNI has implemented an as low as reasonably achievable (ALARA) design program that addresses AB and 10 CFR 835, "Occupational Radiation Protection," requirements regarding ALARA design. (Evaluator: Jeanie Polehn)
- BNI has implemented a standards selection process that addresses AB and contract requirements. (Evaluator: Ninu Kaushal)
- BNI has implemented an effective self-assessment and continuous improvement program. (Evaluator: Pat Carier)

4.0 EVALUATION LOGISTICS

The logistics of the evaluation include the following:

- The BNI point-of-contact is Dennis Klein (371-4867).
- The OSR will conduct a brief entrance meeting at 8:00 a.m. on February 20, 2001.

¹ Open issues are contained in RL/REG-98-09, *DOE Regulatory Unit Initial Safety Evaluation Report of the BNFL Inc. ISA Package*, and are based on BNFL-5193-ISAR-01, *Initial Safety Analysis Report*.

- BNI will provide office space for approximately 12 to 13 persons. Room E257 will be the team meeting area. Rooms B266 and B207 will be available to the team for interviewing BNI personnel. The Team Lead will make arrangements for the initial interview schedule with the BNI points of contact.
- The team will begin its field evaluation activities promptly at 7:30 a.m.
- Each day of the evaluation, the team will conduct a wrap-up meeting at 4:00 p.m. to discuss concerns/issues that developed during the day's activities. Absences from these meetings will be arranged in advance with the Team Lead.
- The Team Lead will conduct daily debriefing sessions at 9:00 a.m. with BNI points of contact and selected BNI managers, if desired, from February 20-22, 2001, to present team concerns/issues identified the previous day.
- An exit briefing will be conducted at 3:00 p.m. on February 23, 2001, at BNI.
- Evaluation team members should adjust their work schedule for the week of February 20-23 to be able to participate in all daily wrap-up meetings and to support the exit meeting.
- Evaluation input will be submitted to the Team Lead by the close of business on February 27, 2001. Format for the input will be provided separately by the Team Lead. The following are some general rules for the input:
 1. Use the term "Contractor," not BNI.
 2. When referring to procedures, provide the title, revision number, and issue date.
 3. Spell out all acronyms the first time they are used.
 4. Use past tense verbs when discussing the assessment.
 5. Provide details to support any issues raised.
 6. Do not excessively document areas where no issues have been identified.

The evaluation report will be issued to the Manager, ORP, by March 1, 2001, with a proposed transmittal evaluation to BNI.

5.0 FIELD EVALUATION TEAM

The team members and their responsibilities are shown in Table 1, and the evaluation areas are presented in Table 2.

Table 1. Team Members and Responsibilities

Team Member	Responsibilities
Lew Miller	Team Lead
Jim Adams	Evaluator – Configuration Management Program
Pat Carier	Evaluator – Self-Assessment and Continuous Improvement; QAP Review
Rob Gilbert	Evaluator – Design Process
Neal Hunemuller	Evaluator – Employee Concerns; Training and Qualifications
George Kalman	Evaluator – AB Maintenance; and ISAR/Topical Meeting Open Items
Ninu Kaushal	Evaluator – Standards Selection Process; ISMP Review
Ron Lerch	Evaluator – Organization and Staffing
Jim McCormick-Barger	Evaluator – Open Inspection Items and Associated Commitments
Bob Griffith	Evaluator – Review of SRD; HAR and ISA related to AB
Jeanie Polehn	Evaluator – ALARA Design Review; RPP Review
Cindy Taylor	Evaluator – QAP Review

HAR – Hazards Analysis Review

ISA – Integrated Safety Analysis

ISAR – Integrated Safety Analysis Report

SRD – Safety Requirements Document

Table 2. Field Team Responsibilities

Item No.	Evaluation Area/Issue	Applicable OSR Inspection Procedure/ Guidance ⁽¹⁾	Evaluator(s)	General Comment
1	Training Program	I-106, "Personnel Training and Qualification Assessment"	Hunemuller	I-106, Sections 3.1-3.2 and 4.1-4.2
2	Configuration Management	I-102, "Configuration Management Assessment"	Adams	(²)
3	Design Process	I-104, "Design Process Assessment"	Gilbert	I-104, Sections 5.1 and 6.1
4	Quality Assurance (QA) (including self-assessment and continuous improvement)	I-101, "Quality Assurance Assessment" I-103, "Self-Assessment and Corrective Action Assessment"	Carier Taylor	(³)
5	ALARA Design	I-111, "Radiological ALARA Design Program Assessment"	Polehn	I-111, Sections 3.1-3.2 and 4.1-4.2
6	Standards Selection	I-105, "Standard Selection Process Assessment"	Kaushal	(⁴)
7	Employee Concerns Program	I-108, "Employee Concerns Program Assessment"	Hunemuller	(⁵)
8	Commitments and Open Items	I-103, "Self-Assessment and Corrective Action Assessment"	McCormick-Barger	
9	Organization and Staffing	RL/REG 97-07, Section 6.10; RL/REG 96-01, Section 4.3.2.1, Item 2	Lerch	
10	AB Maintenance	I-107, "Authorization Basis Management Assessment"	Kalman	
11	Open ISAR and Topical Meeting Items		Kalman,	(⁶)

(¹) Inspection procedure and review guidance criteria will be used only to evaluate changes to programs, procedures and processes approved since the transition to BNI from CHG.

(²) Verifies the programs, procedures, and plans related to configuration management and AB controls have been adopted and that BNI is aware of applicable deficiencies from OSR inspections.

(³) Verifies the QAP has been appropriately modified to reflect that the BNI organization and responsible personnel are knowledgeable of the QAP and the detailed requirements of its implementing procedures.

(⁴) Verifies that the standard selection procedures and processes established by CHG have been adopted by BNI and that BNI personnel are trained on their provisions and use.

(⁵) Verifies that the Employee Concerns Program and its procedures and process established by CHG have been adopted by BNI and responsible personnel have been trained on its provisions and use.

(⁶) Verifies BNI's understanding of the open ISA items and the Topical Meeting issues and plans to address the issues.

6.0 PREVIOUSLY IDENTIFIED COMMITMENTS AND OPEN ITEMS TO BE REVIEWED

This part of the evaluation will determine if CHG has completed the open items from the OSR evaluation of its ability to make changes to the AB (RL/REG-2000-26, *Evaluation of CH2M Hill Hanford Group (CHG) Capability to Safely Change the RPP-WTP Authorization Basis*,) and has transferred all regulatory commitments and open items and their status to BNI. The regulatory commitments and open items from the CHG evaluation, inspections, Topical Meetings and the ISA will be reviewed. The intent of this part of the evaluation is not to close the item but to verify BNI is tracking the items to closure. For BNI's convenience, the following are included with the Evaluation Plan:

Appendix A: Open items from the OSR evaluation of CHG AB changes.

Appendix B: Open items from inspections grouped by evaluation area.

Appendix C: Open items from inspections listed in numerical order (CMS database printout).

Appendix D: CMS report identifying commitments that have been made by the Contractor and that address inspection findings or AB document deficiencies (CMS database printout).

Appendix E: Open issues and actions from Topical Meetings and the ISA.

7.0 REFERENCES

10 CFR 70, "Domestic Licensing of Special Nuclear Material," *Code of Federal Regulations*, as amended.

10 CFR 835, "Occupational Radiation Protection," *Code of Federal Regulations*, as amended.

DOE-HNDB-3010-94, *Airborne Release Fractions/Rates and Respirable Fractions for Nonreactor Nuclear Facilities*, U.S. Department of Energy, 1994.

Initial Safety Analysis Report, BNFL-5193-ISAR-01, Rev. 0, BNFL Inc., Richland, Washington, 1998.

Inspection Report IR-00-004, *Self-Assessment and Corrective Action Inspection Report*, U.S. Department of Energy, Richland, Washington, 2000.

NUREG/CR-6410, Chapter 2, *Nuclear Fuel Cycle Facility Accident Analysis Handbook*, U.S. Nuclear Regulatory Commission, 1998.

RL/REG-96-01, *Guidance for Review of TWRS Privatization Contractor Quality Assurance Program*, Rev. 1, U.S. Department of Energy, Richland Operations Office, 1999.

RL/REG-97-07, *Guidance for the Review of TWRS Privatization Contractor Integrated Safety Management Plan Submittal Package*, Rev. 0, U.S. Department of Energy, Richland Operations Office, 1997.

RL/REG-98-09, *DOE Regulatory Unit Safety Evaluation Report of the BNFL Inc. ISA Package*, Rev. 0, U.S. Department of Energy, Richland Operations Office, 1998.

RL/REG-98-26, *Inspection Technical Procedure*, U.S. Department of Energy, Richland Operations Office, 1998.

ITI-101, Rev. 1, "Quality Assurance Assessment"

ITI-102, Rev. 0, "Configuration Management Assessment"

ITI-103, Rev. 0, "Self-Assessment and Corrective Action Assessment"

ITI-104, Rev. 0, "Design Process Assessment"

ITI-105, Rev. 1, "Standards Selection Process Assessment"

ITI-106, Rev. 0, "Personnel Training and Qualification Assessment"

ITI-107, Rev. 0, "Authorization Basis Management Assessment"

ITI-108, Rev. 0, "Employee Concerns Program Assessment"

ITI-111, Rev. 1, "Radiological ALARA Design Program Assessment"

RL/REG-2000-26, *Evaluation of CH2M Hill Hanford Group (CHG) Capability to Safely Change the RPP-WTP Authorization Basis*, Rev. 0, U.S. Department of Energy, Richland Operations Office, 2000.

8.0 LIST OF TERMS

AB	authorization basis
ALARA	as low as reasonably achievable
BNFL	British Nuclear Fuels Limited, Inc.
BNI	Bechtel National, Inc.
CAR	Construction Authorization Request
CHG	CH2M Hill Hanford Group Inc.
CMS	Commitment Management System
DOE	U.S. Department of Energy
DSF	design safety features
FIN	Finding
IFI	Inspection Follow-up Item
ISA	Initial Safety Assessment
ISAR	Initial Safety Analysis Report
ISM	integrated safety management
ISMP	Integrated Safety Management Plan
ORP	Office of River Protection
OSR	Office of Safety Regulation
PSAR	Preliminary Safety Analysis Report
QA	quality assurance
QAP	Quality Assurance Program
QAPIP	Quality Assurance Program and Implementation Plan

RPP	Radiation Protection Program
RPP-WTP	River Protection Project Waste Treatment Plant
SRD	Safety Requirements Document
WTP	Waste Treatment Plant

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Appendix A. Open Items from OSR's Evaluation of CHG's Capability to Make Changes to the AB

The OSR evaluated CHG's capability to make changes to the AB in November 2000, RL/REG-2000-26, *Evaluation of CH2M Hill Hanford Group (CHG) Capability to Safely Change the RPP-WTP Authorization Basis*. The evaluation concluded the CHG had adequate knowledge of the AB requirements and had the necessary procedures, policies, and trained personnel to adequately maintain the AB and advance the design consistent with the AB requirements if seven conditions were corrected before changing the AB:

1. CHG must clarify the safety responsibilities in the ISMP (Section 5.1.1).
2. CHG must provide an acceptable rationale for the changes to Section 3.0 of Appendix B of the SRD or return to the original wording used by BNFL (Section 5.2.1).
3. CHG must clarify the responsibilities specified for the Sr. Vice Presidents in the QAP (Section 5.4.1).
4. CHG must correctly show the role of the Area Project Managers in the QAP (Section 5.4.1).
5. CHG responsibility for "developing and implementing the QAP" must be assigned to one individual (Section 6.2.1).
6. Contracting representative responsibilities for process initiation in Appendix A of the SRD must be assigned to one individual (Section 6.2.1).
7. CHG must review both the QAP and Chapter 11.0 of the ISMP to ensure that responsibility for key items impacting safety is clearly assigned to a single manager (Section 6.2.1).

CHG notified the OSR² that the seven changes had been made to the respective documents. The OSR subsequently approved CHG's changes.³

In the OSR Evaluation Report, CHG was also asked to promptly make the following change:

- The open deficiency on measuring the effectiveness of training must be corrected (Section 6.2.1).

² CHG-0006663, Letter, J.O. Honeyman, CHG, to W.J. Taylor, ORP, "...Submission of Authorization Basis Change Request ABCN-W375-00-00048, Rev. 2 in Response to Evaluation of CH2M Hill Hanford Group Inc.'s Capability to Safely Initiate Changes in the River Protection Project Waste Treatment and Immobilization Plant," dated November 28, 2000.

³ 01-OSR-0008, Letter, W.J. Taylor, OSR, to F.P. DeLozier, CHG, "Contract No. DE-AC27-99RL14047 -Review of Authorization Basis Change Notice ABCN-W375-00-00048 and Associated Authorization Basis Documents," dated January 12, 2001.

Finally, in the OSR Evaluation Report, CHG was asked to complete the following actions, when convenient:

- CHG should revise Section 11.0 of the ISMP to restore clarity to the individual responsibilities of a particular CHG person or organization (Section 5.1.1).
- The term “Senior Management” should be defined in Table 9-1 of the ISMP (Section 5.1.1).
- The typographical error in the footnotes of Appendix E of the Hazard Analysis Report should be corrected (Section 5.5.1).
- CHG should ensure that upgrades to the design criteria database are completed in time to support the needs of the interim design organization (Section 6.2.1).
- The WTP QA organization should resolve the deficiency in measuring the effectiveness of training and should issue the new procedure on applying a graded approach to QA (Section 6.2.1).
- CHG should ensure that the design authority/review group is adequately staffed, commensurate with the assigned work and its importance to safety (Section 6.2.1).
- CHG should continue to address staff morale to ensure that it does not adversely impact the project’s overall safety (Section 6.3.1).
- CHG should delete the statement "that the changes will be considered approved if not accepted or rejected by the OSR in 30 days" from procedure K13P005 when it is revised (Section 6.4.1).
- CHG should follow up on its stated plan to use the management assessment process to track the "Red Team" assessment of CHG's capability to make changes to the AB (Section 6.4.9).
- CHG should follow through on its stated plan to add implementation steps to the AB maintenance procedure (Section 6.5.1).
- When the design is advanced, CHG should ensure that the relevant ALARA design criteria are well understood by the design engineers to ensure that the design appropriately incorporates ALARA considerations (Section 6.7.1).
- The standards selection process and the design process must be closely coupled and integrated. CHG is encouraged to integrate its design and safety activities so that any AB documents CHG produces are sound (Section 6.8.1).
- The designated process manager should be the Director of Environmental Safety and Health as described in Appendix A of the SRD before restarting the integrated safety management (ISM) process activities (Section 6.8.1).

- Organizational and staffing arrangements (e.g., training and Process Management Team meetings) should be completed before restarting the ISM process activities (Section 6.8.1).
- CHG should submit an updated response to the findings described in OSR Inspection Report IR-00-004, *Self-Assessment and Corrective Action Inspection Report*, describing revised CHG corrective actions and the status of these actions (Section 7.1.1).
- For OSR Inspection Finding IR-00-005-01-FIN, CHG should submit a response that describes CHG's response to the issue (Section 7.1.1).
- CHG should follow through on its stated plan to become more familiar with the issues identified in the Topical Meetings to enhance later processing of the Construction Authorization Request (CAR) (Section 7.2.1).
- CHG should follow through on its stated plan to become more familiar with the ISAR issues (Section 7.3.1).

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Appendix B. Open Items from Inspections Grouped by Evaluation Area

The OSR performed a number of inspections of BNFL throughout the design process; those inspections resulted in a number of findings and corrective actions. CHG has been tracking the open items and closed out many of them during an OSR follow-up inspection performed between December 18, 2000, and January 18, 2001. BNI should continue to track these OSR inspection items to closure. All but the following eight open items have been closed. The numbers in parens after many of the items indicate the CMS number.

Training Program

- IR-00-003-02-IFI concerning review of Contractor's actions to address self-identified programmatic issues (99-CMS-033).

Configuration Management

- IR-99-007-01-FIN concerning failure to implement a process that ensures that the AB is maintained current with the design (00-CMS-003, 00-CMS-005, 00-CMS-006, and 00-CMS-008).
- IR-99-007-05-FIN concerning failure to revise an issued Authorization Basis Change Notice according to requirements of the Quality Assurance Program and Implementation Plan (QAPIP) (99-CMS-051, 99-CMS-052, 99-CMS-053, 99-CMS-055, and 99-CMS-056).
- IR-99-007-06-FIN concerning lack of training of some personnel performing AB management activities (99-CMS-054).

Design Process

- IR-00-001-04-IFI concerning lack of procedures or implementation of QAPIP requirements to define and specify data quality requirements.
- IR-99-008-02-FIN concerning failure to follow procedures.

Employee Concerns Program

- IR-00-002-01-IFI concerning weaknesses in the Employee Concerns Program implementing procedures.

Open Item Closeout Inspection

- IR-00-006-01-FIN concerning failure to provide timely and accurate information relative to inspection item corrective actions..

Appendix C. Open Items from Inspections Listed in Numerical Order

Appendix C provides hardcopies of the CMS database printouts of open items from inspections, listed in numerical order. The database is being updated to reflect closure of the OSR inspection items listed in Appendix B and will be provided to the evaluation team and to BNI at the time of the inspection.

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Appendix D. CMS Report of Contractor Commitments Addressing Inspection Findings or AB Document Deficiencies

Appendix D provides hardcopies of the CMS database printouts of Contractor commitments addressing inspection findings or AB document deficiencies. The database is being updated to reflect closure of the OSR inspection items listed in Appendix B and will be provided to the evaluation team and to BNI at the time of the inspection.

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Appendix E. Open Issues from Topical Meetings and the ISA

This appendix presents the significant unresolved issues from Topical Meetings, Topical Meeting Open Action Items, and ISA Open Issues and Questions.

Significant Unresolved Issues from Topical Meetings

Based on the OSR review of the first 20 OSR/BNFL Topical Meetings, the following is a compilation of the more significant open issues that are most likely to influence future regulatory actions and, therefore, should be completed/resolved to facilitate the CAR approval.

Criticality Control – (1) Justify the use of administrative controls to ensure that monitoring the Pu/solids ratio will provide adequate criticality control, and (2) close out all remaining open criticality safety issues before the CAR is submitted. (Topical Meeting 2)

Explosion Hazard – Resolve hydrogen monitoring requirements in vessels where hydrogen may accumulate. (Topical Meeting 5)

Fire Protection – (1) Reach agreement on the use of automatic fire protection sprinklers throughout the facility, (2) resolve the need for fireproofing structural steel, and (3) develop a formal interface with the Hanford Fire Department. (Topical Meeting 6)

Design Safety Features (DSF) – (1) Reach agreement on the meaning of "unmitigated" consequence analysis; (2) determine bounding source terms; (3) determine uncertainty ranges for initiating frequency and consequences; and (4) justify data, assumptions, and models described in Section 4.3.2.8 of the DSF evaluation report. (Topical Meeting 7)

Dose Assessment – (1) Provide a comparison between the Sellafield database, DOE-HNDB-3010-94, *Airborne Release Fractions/Rates and Respirable Fractions for Nonreactor Nuclear Facilities*, and NUREG/CR-6410, *Nuclear Fuel Cycle Facility Accident Analysis Handbook*; (2) clarify dose assessment methodology, particularly as it relates to using passive mitigating features for unmitigated events; and (3) provide Sellafield database references to support using Sellafield data in the Preliminary Safety Analysis Report (PSAR). (Topical Meeting 8)

Emergency Response Plan – Provide a draft Emergency Response Plan for OSR review and provide the OSR with the relevant references in the Sellafield database for use in the facility PSAR. (Topical Meeting 9)

Seismic Analysis and Design Criteria – Provide analysis to demonstrate compliance with RPP-WTP exposure limits for beyond-design-basis seismic events. (Topical Meeting 10)

Test Plan for Technology Development – (1) Resolve technical issues associated with ongoing process development and testing and (2) develop performance and quality requirements for contractors developing technology and performing process testing. (Topical Meeting 11)

Explosive Hazards I and II – (1) Respond to written OSR questions on explosive hazards, and (2) finalize Explosive Hazard Evaluation. (Topical Meetings 12 and 13)

Cesium Storage Tank Cooling – (1) Finalize the dose assessment methodology for evaluating tank releases, and (2) develop control strategy, with appropriate reliability, to control or mitigate the cesium storage tank hazard. (Topical Meeting 14)

Seismic Probabilistic Risk Analysis Dose Consequence – (1) Evaluate dose consequences of beyond-design-basis seismic events, and (2) determine if facility design modifications will be necessary to limit radiological exposures resulting from beyond-design-basis seismic events. (Topical Meeting 14)

ISM Cycle I – (1) Develop process to address chemical hazards and industrial health and safety issues, (2) incorporate inadvertent criticality into the Cycle II hazards evaluation process, and (3) revise Codes of Practice and design control to achieve consistency between work execution and procedures. (Topical Meeting 15)

Chemical Hazards – A robust control strategy for the consequences of NO_x releases inside the facility should be developed. Also, the process for evaluating chemical hazards in general should be defined in more detail (e.g., the process for determining above threshold quantities versus below threshold quantities; chemical hazard criteria used to classify systems, structures, and components as to safety design class, safety design significant, or Important to Safety; and defense in-depth criteria for chemical hazards). (Topical Meeting 19)

ISM Cycle 2 – ISM Cycle 2 should be upgraded to incorporate the B-1 design. BNFL should demonstrate the ability to implement the ISM process to its conclusion, i.e., selection of design basis events and the standards. (from Topical Meeting 20)

Topical Meeting Open Action Items

Action items were identified during the 20 topical meetings. While most of these were closed following the meetings, the following action items remain open:

- BNFL agreed to evaluate waste nonhomogeneity in the criticality analysis and to forward the analysis results to the OSR when complete (i.e., prior to PSAR submittal). (Topical Meeting 2, September 1998)
- BNFL will include analysis of the transuranic storage tank in the criticality analysis and will forward the analysis results to the OSR when complete (i.e., prior to PSAR submittal). (Topical Meeting 2, September 1998)
- BNFL criticality analysis will include off-normal and accident considerations. (Topical Meeting 2, September 1998)
- BNFL will keep the OSR informed concerning any incompatibilities with the requirements of 10 CFR 70, “Domestic Licensing of Special Nuclear Material,” that

develop during the course of the vitrification plant design. (Topical Meeting 2, September 1998)

- BNFL will provide reasonable advance notice to the OSR for desired working and/or formal meetings desired on 10 CFR 70. (Topical Meeting 2, September 1998)
- To meet the specific needs of detailed scientific or parametric testing programs, it is essential to establish the performance requirements of the analytical laboratory in any binding contract before laboratory processes are initiated. BNFL has used the Minimum Reportable Quantity to specify the performance criteria for detection limit in the Task Specification of the Test Plans. However, other performance criteria, e.g., accuracy and precision, have not been found in the Test Plan. How does BNFL verify and validate the analytical data generated by its subcontractors? Without specifying QA requirements (e.g., accuracy and precision), how does BNFL ensure the integrity of the data? (Topical Meeting 12, July 1999)
- The OSR will review the BNFL heat transfer analysis of the cesium storage tank cooling. (Topical Meeting 15, October 1999)
- BNFL will include specific treatment of control strategies to prevent or mitigate inadvertent criticality in the Cycle 2 process, as stated in the topical meeting. (Topical Meeting 16, November 1999)
- BNFL will provide the OSR with the design guide for risk assessment methodology when it becomes available. (Topical Meeting 16, January 2000)
- BNFL will provide the OSR with the basis for the safety classifications of systems, structures, and components (e.g., important-to-safety designations and seismic category) as tabulated in the topical meeting submittal. (Topical Meeting 17, February 2000)
- The OSR has provided review comments and questions related to the March 2000 topical meeting in the attachment to the meeting minutes. (Topical Meeting 18, March 2000)
- BNFL will respond to the OSR comments from Topical Meeting 19. (Topical Meeting 19, April 2000)
- BNFL will respond to the OSR comments from Topical Meeting 20 (Topical Meeting 20, May-June 2000)

ISA Open Issues and Questions

The ISA for the proposed RPP-WTP identified 133 open issues and questions. Fourteen of the issues and questions remain open and should be closed before the CAR is submitted. After each of the 14 items, the document section and number are indicated in parenthesis:

Question 31 – Deals with loss-of-power events (p. B-19, RL/REG-98-09)

Q. 92 – Deals with assessing an accident involving a high-level waste line break (p. B-85, RL/REG-98-09)

Adequate Safety Basis Not Demonstrated (p. 125, RL/REG-98-09)

A2 – Design-basis accidents like earthquakes, fire, or loss of power that may initiate multiple process system failures must be identified. An adequate safety basis must be established that accounts for these multiple system failures (Section 3.1.6, "Electrical Systems and Instrumentation & Control," BNFL-5193-ISAR-01).

A3 – Adequate justification for selection of the bounding events presented in Section 4.7.1 of the ISAR must be provided. The selected events were not always the worst-case events as described in the Hazard Analysis Report (Section 3.3.1, "Hazards Assessment," BNFL-5193-ISAR-01).

A8 – Risk goals for operations accidents and worker accidents must have sufficient basis to demonstrate that they can be met (Section 3.3.2, "Hazards Control," BNFL-5193-ISAR-01).

A9 – The safety basis for bounding and design-basis events must be risk-based (Section 3.3.2, "Hazards Control," BNFL-5193-ISAR-01).

A15 – Accident sequence descriptions for postulated accidents must include sufficient detail to define the initiating events and the procedural faults and potential failure modes (including common-mode and common-cause failures) of systems that are proposed to prevent or mitigate the consequences of an accident (Section 3.5.2, "Catastrophic Failure of Vessels Containing Radioactive Material"; Section 3.5.4, "Canister Mishandling"; Section 3.5.5, "Loss of Cooling" and Section 3.6, "Adequacy of Categorization of SSCs," BNFL-5193-ISAR-01).

A18 - Credible events, such as compartment fires, radiolytic hydrogen deflagration or detonations, and the over-pressurization events from offgas failures, must be examined as part of the set of design-basis events, or adequate justification provided for their exclusion (Section 3.5.7, "Evaluation Summary," BNFL-5193-ISAR-01).

Incomplete or Conflicting Elements of the Authorization Basis (p. 128, RL/REG-98-09)

C30 – ISAR, Section 3.6, is inadequate for an Operational Analysis and Assessments Report Outline. While Section 3.6 is consistent with the SRD and ISMP, it does not sufficiently address the analysis and assessment reports that will be required in the operations phase (Section 3.11.10, "Operational Analysis and Assessment Reports Outline," BNFL-5193-ISAR-01).

Incomplete Design or Operational Information (p. 130, RL/REG-98-09)

D10 – The detail for chemical control and handling, including instrumentation and procedural controls, will need to be worked out and analyzed and the appropriate set of controls identified (Section 3.1.7, "Chemical Handling and Storage").

D11 – The technical issues identified in BNFL-5193-RPT-006, Rev. 0 (described in the "Common/Future Work" sections of the tables and "operability problems" in Section 8.2), need

to be fully addressed and resolved during detailed design activities (Section 3.1.7, "Chemical Handling and Storage," BNFL-5193-ISAR-01).

D12 – BNFL should consider accidental mixing and loss of containment of chemicals as a hazard to the facility worker and the co-located worker (Section 3.1.7, "Chemical Handling and Storage," BNFL-5193-ISAR-01).

D13 – The methods of bulk chemical storage (e.g., silos, tote bins, and pallets) need to be fully described and evaluated (Section 3.1.7, "Chemical Handling and Storage," BNFL-5193-ISAR-01).

D15 – A safety review should be performed of the receipt, storage, and handling of the glass formers (Section 3.1.7, "Chemical Handling and Storage," BNFL-5193-ISAR-01).

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